Methods of measuring programming language popularity include: counting the number of job advertisements that mention the language, the number of books sold and courses teaching the language (this overestimates the importance of newer languages), and estimates of the number of existing lines of code written in the language (this underestimates the number of users of business languages such as COBOL)..  
Normally the first step in debugging is to attempt to reproduce the problem.  
 Debugging is often done with IDEs. Standalone debuggers like GDB are also used, and these often provide less of a visual environment, usually using a command line.  
Programmers typically use high-level programming languages that are more easily intelligible to humans than machine code, which is directly executed by the central processing unit.  
Scripting and breakpointing is also part of this process.  
 The academic field and the engineering practice of computer programming are both largely concerned with discovering and implementing the most efficient algorithms for a given class of problems.  
There are many approaches to the Software development process.  
However, Charles Babbage had already written his first program for the Analytical Engine in 1837.  
He gave the first description of cryptanalysis by frequency analysis, the earliest code-breaking algorithm.  
However, with the concept of the stored-program computer introduced in 1949, both programs and data were stored and manipulated in the same way in computer memory.  
As early as the 9th century, a programmable music sequencer was invented by the Persian Banu Musa brothers, who described an automated mechanical flute player in the Book of Ingenious Devices.  
 Implementation techniques include imperative languages (object-oriented or procedural), functional languages, and logic languages.  
It involves designing and implementing algorithms, step-by-step specifications of procedures, by writing code in one or more programming languages.  
 Machine code was the language of early programs, written in the instruction set of the particular machine, often in binary notation.  
 Whatever the approach to development may be, the final program must satisfy some fundamental properties.